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REMARKS

In view of the following discussion, the Applicant submits that none of the claims now pending in the application is obvious under the provisions of 35 U.S.C. § 103. Thus, the Applicant believes that all of these claims are now in allowable form.

In addition, the Applicant's representative would like to thank Examiner Ton for kindly taking a substantial amount of time on August 31, 2004 to discuss the merits of the subject invention. The Applicant's representative is aware of the time constraint that is placed on the Examiner and is appreciative of the Examiner's willingness to devote such large quantity of time to discuss the case on the merits.

I. REJECTION OF CLAIMS 11-28 UNDER 35 U.S.C. § 103

Claims 11-28 stand rejected as being obvious over the Vu patent (United States Patent No. 5,056,085, issued October 8, 1991, hereinafter "Vu") in view of the Mahany patent (United States Patent No. 5,657,317, issued August 12, 1997, hereinafter "Mahany"). The Applicant respectfully traverses the rejection.

Vu teaches a method for routing broadcast packets in a packet-switched network. Broadcast packets are periodically sent out in a constrained flood broadcast. If a receiving node has previously received a broadcast packet, the receiving node discards the packet. However, if the receiving node has not previously received the broadcast packet, the receiving node sends a packet receipt acknowledgement back to the node from which the broadcast packet was sent. The receiving node also forwards the broadcast packet to further nodes in the network, e.g., in accordance with the constrained flood broadcast. Each node in the network also records the other nodes from which it has received acknowledgments, and the recording node continues to forward further broadcast packets to those same other nodes until new packet forwarding routes are determined.

Mahany teaches a hierarchical communication system in which a plurality of wireless local area networks (LANs) having different characteristics are used to link portable or mobile computing devices. Each LAN includes a base station that acts as a control point for the devices on the local network and facilitates mobility of the linked

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devices by transmitting HELLO messages to the devices. These HELLO messages contain information about neighboring base stations, such as pending changes in the neighboring base station's entire associated network (See Mahany, column 25, lines 27-28: "HELLO messages may also contain information regarding pending changes in the local NET." Emphasis added), the neighboring base station's address, and the ability of the neighboring base station to handle additional traffic, among other information (See Mahany, column 29, lines 57-63).

The Examiner's attention is directed to the fact that Vu and Mahany, either singly or in any permissible combination, fail to disclose or suggest the novel invention of transmitting a HELLO message that comprises only a list of neighbor nodes that have status changes, as claimed in Applicant's independent claims 11 and 20. Specifically, Applicant's claims 11 and 20 positively recite:

11. A method of operating a network having a plurality of nodes, comprising:
 - maintaining in a receiving node a neighbor table comprised of each known neighbor node of the receiving node and the communication status of each known neighbor node;
 - receiving a HELLO message containing an address of a new sending node;
 - transmitting a NEIGHBOR message that includes an address of the receiving node to said new sending node;
 - receiving a NEIGHBOR ACK message from said new sending node;
 - updating said neighbor table to reflect discovery of said new sending node and communication status of said new sending node; and
 - transmitting at least one HELLO message comprising only a list of neighbor nodes that have communication status changes. (Emphasis added)
20. A network having a plurality of nodes, comprising:
 - a new sending node; and
 - a receiving node having a neighbor table comprised of each known neighbor node of the receiving node and the communication status of each known neighbor node, wherein said receiving node receives a HELLO message from said new sending node containing an address of said new sending node, wherein said receiving node transmits a NEIGHBOR message that includes an address of the receiving node to said new sending node, wherein said receiving node receives a NEIGHBOR ACK message from said new sending node, wherein said receiving node updates said neighbor table to reflect discovery of said new sending node and communication status of said new sending node, and wherein said receiving node transmits at least one HELLO message comprising only a list of neighbor nodes that have communication status changes.

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(Emphasis added)

The Examiner conceded that Vu fails to teach a HELLO message comprising only a list of neighbor nodes that have communication status changes, i.e., as recited by the Applicant's independent claims 11 and 20. Nevertheless, the Examiner alleged that Mahany discloses such a HELLO message. To the contrary, the Applicant respectfully submits that Mahany does not bridge this gap in the teachings of Vu. As discussed above, Mahany teaches a HELLO message that contains information about neighboring base stations on a hierarchical communication system, such as pending changes in the neighboring base station's entire associated network, the neighboring base station's address, and the ability of the neighboring base station to handle additional traffic, among other information. Thus, Mahany teaches that the HELLO message communicates a great deal of varied information for the entire network. This is directly in contrast to Applicant's claimed invention.

The Applicant's invention is directed to a reduced-overhead protocol for detecting the existence of new neighbor nodes and the loss of existing neighbor nodes in a mobile wireless network. In a typical mobile wireless network, each node in the network uses a neighbor discovery protocol to maintain current information concerning the neighboring nodes with which it can establish bi-directional communications. The node also typically forwards current information regarding the identities (e.g., addresses) of its neighboring nodes to other nodes in the network. Unfortunately, the excessive communication overhead for conventional neighbor discovery protocols consumes a great deal of bandwidth in the networks in which they are deployed. For example, in order to inform other nodes in the network of the identity of even one new or lost node, a detecting node must typically transmit a message to the other nodes that comprises an entire neighbor table including identities for all of that node's neighbors. These protocols are therefore not efficient for networks having limited bandwidth and/or networks in which link states between nodes may change frequently.

The Applicant's invention enables network nodes to efficiently detect and broadcast the statuses of neighboring nodes by reporting only a list of neighbor nodes having status changes. Each node in the network maintains a neighbor table that has

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an entry for every known neighbor node and their corresponding states (e.g., connected or "heard, disconnected or "lost"). When a node confirms the existence of a new neighbor node, or confirms a new state for a previously known neighbor node, the confirming node then sends a HELLO message to other nodes in the network. This HELLO message contains only a list of the neighbor nodes that have experienced a state change (including newly detected neighbor nodes). Thus, a tremendous amount of network bandwidth may be conserved by transmitting only the new information.

In contrast, the combination of Vu and Mahany at most teaches detecting changes in the states of neighboring nodes and transmitting information about the entire network to which those neighboring nodes belong. Thus, as taught by the cited references, the information about the network that is transmitted in the HELLO message includes a tremendous amount of data concerning various aspects of the respective network, including information in addition to a list of neighbor nodes that have communication status changes. The combination of Vu and Mahany thus fails to teach or make obvious a method for monitoring the states of neighbor nodes wherein a HELLO message sent from the monitoring node to other nodes in the network contains only a list of neighbor nodes that have communication status changes, as positively claimed by the Applicant in claims 11 and 20. Therefore, the Applicant submits that independent claims 11 and 20, fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder. The Examiner indicated during the interview of August 31, 2004 that he will reconsider the rejections under 35 U.S.C. §103 upon receiving Applicant's written response.

Dependent claims 12-19 and 21-28 depend respectively from claims 11 and 20, and recite additional features therefore. As such, and for the exact same reason set forth above, the Applicant submits that claims 12-19 and 21-28 are not made obvious by the teachings of Vu in view of Mahany. Therefore, the Applicant submits that dependent claims 12-19 and 21-28 also fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder.

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Conclusion

Thus, the Applicant submits that all of the presented claims fully satisfy the requirements of 35 U.S.C. §103. Consequently, the Applicant believes that all these claims are presently in condition for allowance. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

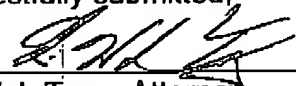
If, however, the Examiner believes that there are any unresolved issues requiring the issuance of a final action in any of the claims now pending in the application, it is requested that the Examiner telephone Mr. Kin-Wah Tong, Esq. at (732) 530-9404 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Date

9/20/04

Moser, Patterson & Sheridan, LLP
595 Shrewsbury Avenue
Shrewsbury, New Jersey 07702

Respectfully submitted,


Kin-Wah Tong, Attorney
Reg. No. 39,400
(732) 530-9404